

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Singer et al.
Serial No: Not Yet Assigned
For: ILLUMINATION SYSTEM WITH RASTER ELEMENTS OF
DIFFERENT SIZES
Filed: Concurrently Herewith
Examiner: Not Yet Assigned
Art Unit: Not Yet Assigned Docket No.: 637.0016USU

PRELIMINARY AMENDMENT

Box: Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Preliminary to examination, please amend the above-noted patent application as follows:

IN THE CLAIMS

Please amend the claims below to read as indicated herein. A version of the amended claims with markings to show changes made is included at the end of this document.

1. (Amended) An illumination system for lithography with wavelengths of ≤ 193 nm comprising:

a first optical element, which is divided into first raster elements and lies in a first plane, wherein said first plane defines an x-direction and a y-direction,

wherein said first raster elements each have an x-direction and a y-direction with an aspect ratio, and
wherein at least two of said first raster elements have aspect ratios of different magnitude.

2. (Amended) The illumination system according to claim 1, further comprising a second optical element, which is divided into second raster elements,

wherein a second raster element is assigned to a first raster element, and
wherein at least one second raster element has an anamorphic optical effect.

3. (Amended) The illumination system according to claim 2, wherein the illumination system defines a field,

wherein said field is illuminated in an object plane of the illumination system, and
wherein at least some of said second raster elements have an anamorphic optical effect,
which is selected such that an aspect ratio of images of said first raster elements is substantially the same in said object plane, independent of said aspect ratio of said first raster elements.

4. (Amended) The illumination system according to claim 1, wherein at least one of said at least two first raster elements with aspect ratios of different magnitude has an anamorphic optical effect.

5. (Amended) The illumination system according to claim 1, wherein said at least two first raster elements with aspect ratios of different magnitude have an isotropic optical effect.

6. (Amended) The illumination system according to claim 5, wherein said first raster elements have an isotropic optical effect.

7. (Amended) The illumination system according to claim 1, wherein said first raster elements that have an anamorphic optical effect are of a shape selected from the group consisting of cylinders and toroids.

8. (Amended) The illumination system according to claim 2, wherein said second raster elements that have an anamorphic optical effect are of a shape selected from the group consisting of cylinders and toroids.

9. (Amended) The illumination system according to claim 1, wherein all of said first raster elements are completely illuminated in said first plane.

10. (Amended) The illumination system according to claim 1, further comprising a collector unit, which illuminates said first plane with said first raster elements.

11. (Amended) The illumination system according to claim 1, further comprising at least one field mirror.

12. (Amended) The illumination system according to claim 2, further comprising at least one field mirror, wherein said second raster elements and said at least one field mirror image said assigned first raster elements in an object plane of the illumination system.

13. (Amended) The illumination system according to claim 1, wherein said first raster elements are rectangular.

14. (Amended) The illumination system according to claim 1,
wherein the illumination system defines a field to be illuminated in an object plane of the
illumination system, and
wherein said field represents a segment of a ring field.

15. (Amended) A projection exposure system for microlithography, comprising:
an illumination system according to claim 1 with an exit pupil, which partially collects an
emission produced by a light source and further guides it to illuminate a field in an
object plane of the illumination system;

a pattern-bearing mask, which lies in said object plane;
a projection device, with an entrance pupil, which coincides with an exit pupil of the
illumination system, wherein said projection device images a lighted portion of said
pattern-bearing mask in an image field of said projection device; and
a light-sensitive substrate, which lies in a plane of said image field.

16. (Amended) A method for producing microelectronic components, comprising using the
projection exposure system according to claim 15.

Please add the following claims.

17. (New) An illumination system, comprising:
an optical element having a first raster element and a second raster element,
wherein said first raster element has a first aspect ratio,
wherein said second raster element has a second aspect ratio, and
wherein said first aspect ratio is not equal to said second aspect ratio.

18. (New) An illumination system for radiation wavelengths of ≤ 193 nm, comprising an
optical element having a first raster element and a second raster element of different sizes.

REMARKS

This application contains claims 1 through 18. Claims 17 and 18 are newly added.

The present application was originally drafted in German, and then translated into English. In the present amendment, Applicants amended the claims to remove multiple dependencies, to conform to US drafting style, and to delete extraneous language. Applicants have not limited the scope of any term in any claim, and thus, Applicants respectfully submit that the doctrine of equivalents is available for all terms of all of the claims. Favorable consideration is respectfully urged.

Respectfully submitted,

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Date

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IN THE CLAIMS

1. (Amended) ~~Illumination~~ An illumination system, particularly for lithography with wavelengths of ≤ 193 nm comprising:

1.1 a first optical element, which is divided into first raster elements and lies in a first plane, whereby

wherein said first plane defines an x-direction and an a y-direction, whereby

1.2 the images of the first raster elements superimpose in an object plane of the ~~illumination system and~~

1.4 ~~the~~ wherein said first raster elements each have an x-direction and a y-direction with ~~a~~ an aspect ratio, and

characterized in that

1.5 wherein at least two of said first raster elements ~~each have a aspect ratio ratios~~ of different magnitude.

2. (Amended) The illumination ~~Illumination~~-system according to claim 1, further characterized in that

~~the illumination system comprises~~ further comprising a second optical element, which is divided into second raster elements, whereby

wherein a second raster element is assigned to a first raster element, and whereby

wherein at least one second raster element has an anamorphic optical effect.

3. (Amended) The illumination ~~Illumination~~-system according to claim 2, further characterized in that wherein the illumination system defines

a field ~~with a field aspect ratio,~~

wherein said field is illuminated in ~~the~~ an object plane of the illumination system, and

wherein at least some of ~~the~~ said second raster elements have an anamorphic optical effect, which is selected such that ~~the~~ an aspect ratio of ~~the~~ images of ~~the~~ said first raster elements is substantially the same in ~~the~~ said object plane, independent of ~~the~~ said aspect ratio of ~~the~~ said first raster elements.

4. (Amended) The illumination ~~Illumination~~-system according to ~~one of claims 1 to 3~~claim 1,

~~further characterized in that~~wherein

at least one of ~~the said~~ at least two first raster elements with aspect ratios of different magnitude has an anamorphic optical effect.

5. (Amended) The illumination ~~Illumination~~-system according to ~~one of claims 1 to 3~~claim 1,

~~further characterized in that~~wherein

~~the said~~ at least two first raster elements with aspect ratios of different magnitude have an isotropic optical effect.

6. (Amended) The illumination ~~Illumination~~-system according to claim 5,

~~further characterized in that~~wherein

~~the said~~ first raster elements have an isotropic optical effect.

7. (Amended) The illumination ~~Illumination~~-system according to ~~one of claims 1 to 5~~claim 1,

~~further characterized in that~~wherein

~~these said~~ first raster elements that have an anamorphic optical effect are of a shape selected from the group consisting of cylinders and/or and toroids.

8. (Amended) The illumination ~~Illumination~~-system according to ~~one of claims 1 to 7~~claim 2,

~~further characterized in that~~wherein

~~these said~~ second raster elements that have an anamorphic optical effect are of a shape selected from the group consisting of cylinders and/or and toroids.

9. (Amended) The illumination ~~Illumination~~-system according to ~~one of claims 1 to 8~~claim 1,

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further characterized in that wherein

all of the said first raster elements are completely illuminated in the said first plane.

10. (Amended) The illumination ~~Illumination~~-system according to ~~one of claims 1 to 9~~ claim 1,

further characterized in that

~~the illumination system has~~ further comprising a collector unit, which illuminates the said first plane with the said first raster elements.

11. (Amended) The illumination ~~Illumination~~-system according to ~~one of claims 1 to 10~~ claim 1,

further characterized in that

~~the illumination system has~~ further comprising at least one field mirror.

12. (Amended) The illumination ~~Illumination~~-system according to claim ~~11~~ 2,
further comprising at least one field mirror,

further characterized in that wherein

the said second raster elements and the said at least one field mirror image the said assigned first raster elements in the an object plane of the illumination system.

13. (Amended) The illumination ~~Illumination~~-system according to ~~one of claims 1 to 12~~ claim 1,

further characterized in that wherein

the said first raster elements are rectangular.

14. (Amended) The illumination ~~Illumination~~-system according to ~~one of claims 1 to 13~~ claim 1,

~~further characterized in that~~ wherein the illumination system defines

the a field to be illuminated in the an object plane of the illumination system, and
wherein said field represents a segment of a ring field.

15. (Amended) ~~Projection-A~~ projection exposure system for microlithography-with , comprising:

~~15.1~~ an illumination system according to ~~one of claims 1 to 14~~ claim 1 with an exit pupil-(112), which partially collects ~~the~~ an emission produced by a light source (100)-and further guides it to illuminate a field in ~~the~~ an object plane of the ~~Illumination-illumination~~ system;

~~15.2~~ a pattern-bearing mask, which lies in ~~the~~ said object plane-(114)-of the ~~Illumination-system~~;

~~15.3~~ a projection device, ~~particularly a projection objective (126)~~ with an entrance pupil, which coincides with ~~the~~ an exit pupil-(112) of the ~~Illumination illumination~~ system, ~~whereby this~~ wherein said projection objective device images ~~the~~ a lighted portion of ~~the~~ said pattern-bearing mask in an image field of ~~the~~ said projection device; and

~~15.4~~ a light-sensitive substrate-(124), which lies in ~~the~~ a plane of ~~the~~ said image field-of-the-projection-device.

16. (Amended) ~~Method-A~~ method for producing ~~microelectronic-microelectronic~~ components, ~~particularly semiconductor chips with a~~ comprising using the projection exposure system according to claim 15.

Claims 17 and 18 are newly added.